CONSERVATION Showcase

Flipping the Power Switch

Do you want to save energy on your farm? You bet – who doesn't? Do you have an operation that uses irrigation pumps, a greenhouse, or refrigeration?

Then Eric Biderman's story is for you.

From Ribera, New Mexico, Eric Biderman is exploring energy savings technologies and demonstrating his success to small farmers in New Mexico and Colorado. He was the recipient of an NRCS Conservation Innovation Grant in September 2004 intended for the design, installation, demonstration, and evaluation of the use of two innovative solar energy technologies in a small farm setting. He then transferred this technology to other producers.

The project involves two technologies: a grid-tie photovoltaic system and a solar hydronic heating system.

The grid-tie photovoltaic (PV) system consists of 20 photovoltaic panels that would meet the electrical needs of his irrigation pumps, greenhouse fans, and refrigeration. The panels are mounted pointing to true south at an angle of 36.8 degrees, approximately equal to our latitude, thus creating good solar gain in both summer and winter.

When the PV panels are producing less power than being used (such as at night, during cloudy days, or if using several machines at the same time), the electric meter runs forward. When the meter is running backwards, the system is feeding power into the utility grid. The goal is to have the farm be energy neutral or even be a net power producer.

The solar hydronic heating system started with preparing a cement slab for the greenhouse. Blue foam was installed underneath and around the edges to keep the heat in. Black plastic is a vapor barrier to help the concrete last longer. Wire-welded fabric was used to strengthen the concrete. Orange tubes loop around that carry water.

Four inches of concrete were poured so the tubes became imbedded in the concrete. Three 4 x 8 solar hot water collectors and a small photovoltaic panel were mounted at an angle of about 45 degrees pointing due south. These were mounted at a steeper angle than the PV panels from the grid-tie system since the most heat from this system is needed in early spring when planting in the greenhouse. The small PV panel powers a pump which moves water through the panels when the sun is shining.

A pump is connected to a thermostat in the seeding area so it turns on whenever the temperature gets below 70 degrees (70 degrees F is the optimal temperature for germination of most seeds). There are also some valves and outlets for future expansion. If the system is producing more heat than the seeding area needs, the heat can be used somewhere else.

Biderman has long been a conservation innovator on his northern New Mexico organic farm where he grows beans, flowers, and lettuce. He is a member of the Quivira Coalition and Santa Fe Farmers Market, and is experimenting with various diesel substitutes and constantly exploring technologies suitable for implementation in small farms and rural areas.